Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Update to Parts 2 and 25 Concerning	)	IB Docket No. 16-408
Non-Geostationary, Fixed-Satellite	)	
Service Systems and Related Matters	)	

PETITION FOR RECONSIDERATION OF WORLDVU SATELLITES LIMITED

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WorldVu Satellites Limited, d/b/a OneWeb ("OneWeb"), pursuant to Section 1.429 of the Commission's rules,[1] hereby petitions for reconsideration of the Report & Order and Further Notice of Proposed Rulemaking adopted by the Federal Communications Commission (the "FCC" or "Commission") on September 26, 2017 in the above-referenced proceeding.[2]

I. INTRODUCTION AND SUMMARY

In the NGSO R&O, the Commission considered three alternative sharing criteria to enable spectrum access for the development of non-geostationary orbit ("NGSO") fixed-satellite service ("FSS") systems. These three methods included use of avoidance angles, ITU filing date, or a sharing mechanism based on the change in system noise temperature caused by interference between two systems ("Δ T/T") of 6 percent or more (the "Coordination Trigger").[3]

[1] 47 C.F.R. § 1.429(a).

[2] *In re Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Report & Order and Further Notice of Proposed Rulemaking, 32 FCC Rcd 7809 (2017) (the "*NGSO R&O*").

[3] *NGSO R&O*, 32 FCC Rcd at 7824-25 ¶ 47.

According to the Commission, OneWeb proposed the Coordination Trigger.[4] It is true OneWeb introduced the Coordination Trigger into the record of this proceeding,[5] but only to be used as a trigger to determine when detailed coordination is necessary.[6] OneWeb explained in its Reply Comments that once the Coordination Trigger has been surpassed and the parties are unable to reach a coordination agreement following good faith negotiations, the Commission should fall back on filing date priority as the overarching rule to determine how both systems can be protected during Stage 2 Coordination (the "Global Public Notice Rule").[7]

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[4] *Id*.

[5] *See In re Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Comments of OneWeb, IB Docket No. 16-408, at 9 (filed Feb. 27, 2017) ("*OneWeb Comments*"); *In re Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Reply Comments of OneWeb, IB Docket No. 16-408, at 23-24 (filed Apr. 10, 2017) ("*OneWeb Reply Comments*").

[6] The word "coordination" is a term of art that has multiple meanings in satellite parlance. It is sometimes used to refer to the process of exchanging technical information between two satellite operators in an effort to determine whether interference between the satellite systems will occur. Other times it is used to refer to the active mitigation measures that must be implemented by one or both of the satellite operators in order to avoid any interference from occurring. In this Petition, we sometimes refer to the former as Stage 1 Coordination and the latter as Stage 2 Coordination. While OneWeb acknowledges that all NGSO FSS operators should exchange operational information to ensure that their systems do not exceed the Coordination Trigger (i.e., Stage 1 Coordination), only systems that do exceed the Coordination Trigger should be required to engage in detailed coordination negotiations to address and potentially adopt mitigation measures (i.e., Stage 2 Coordination).

[7] *OneWeb Reply Comments* at 19-20 (ITU priority should "govern in-line interference events in all authorized NGSO FSS bands" and the Commission should rely upon "ITU coordination priority in lieu of band segmentation when applying the avoidance of in-line interference mechanism in NGSO-authorized bands.").

The Commission however, utilized the Coordination Trigger for *band splitting* in the NGSO R&O.[8] By failing to adopt the Global Public Notice Rule and instead adopting the Band-Splitting Rule, the Commission has undermined the ability of NGSO FSS applicants to plan, design, finance, build, launch, and operate their systems. The Commission should reconsider the Band-Splitting Rule and instead adopt the Global Public Notice Rule for the reasons explained below.

II. THE GLOBAL PUBLIC NOTICE RULE BENEFITS ALL APPLICANTS EQUALLY

In the NGSO R&O, the Commission rejected the proposal to rely upon filing date priority for reasons that do not withstand scrutiny.[9] First, the Commission erroneously suggested a Global Public Notice Rule would "give no certainty to other operators that they may use any portion of the spectrum absent [the earlier-filed operator's] consent."[10] This appears to be a misunderstanding. The Commission mandates that all applicants engage in good faith coordination negotiations, which will prevent operators from making any arbitrary coordination claims.[11] The Commission further clarified its authority to review the status of coordination discussions and is empowered to force reluctant operators to cooperate with others. Moreover,

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[8] The Commission mandated "band-splitting when the Δ T/T of an interfered link exceeds 6 percent" in the absence of a coordination agreement between parties. *NGSO R&O*, 32 FCC Rcd at 7825 ¶ 49 (the "Band-Splitting Rule").

[9] While the Global Public Notice Rule is somewhat different than Telesat's proposal to rely exclusively on ITU priority, there is clear overlap between the two proposals.

[10] *NGSO R&O*, 32 FCC Rcd at 7825 ¶ 50. The Commission also suggests – with no basis in the record to support it – that relying on ITU priority will create a single "winner." *Id*. The long history of both GSO and NGSO coordination discussions in reliance upon ITU priority has resulted in a proliferation of satellite networks around the world. This fact alone suggests the Commission's assumption of a single "winner" under the Global Public Notice Rule cannot be right.

[11] *NGSO R&O*, 32 FCC Rcd at 7825 ¶ 48.

higher priority operators are only able to protect the system for which they have filed and cannot arbitrarily prevent others from using spectrum in a non-interfering way. Subsequent applicants are free to design around the higher priority system and perfect their own rights, for which they will also then have their own priority and protection.

For example, suppose satellite company A publicly files for a specific system architecture. Satellite company B then designs its system around satellite company A and publicly files for its particular system architecture. In this case, both company A and company B will have the same priority protection. Just as company B cannot design its satellite system to interfere with company A's system, company A cannot redesign or modify its satellite system to interfere with company B's system beyond the level of interference permitted under its original global public notice. Both companies enjoy equal protection under ITU coordination rules and should also have the same protection in the United States.

If the Commission were correct in stating that the Global Public Notice Rule "would give no certainty to other operators that they may use any portion of the spectrum absent [the higher priority operator's] consent"[12], then company B would have to obtain company A's consent to operate its satellite network. However, in the example above, company A's consent is not essential under the proposed Commission coordination procedures.[13]

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[12] *Id.* at 7825 ¶ 50. The Commission also suggests – with no basis in the record to support it – that relying on ITU priority will create a single "winner." *Id*. The long history of both GSO and NGSO coordination discussions in reliance upon ITU priority has resulted in a proliferation of satellite networks around the world. This fact alone suggests the Commission's assumption of a single "winner" under the Global Public Notice Rule cannot be right.

[13] For example, Telesat was able to design a system which presumably protects O3b Networks ("O3b"), while having assurance that its particularly unique design would be protected from others in the future. While Telesat still has an obligation to conduct coordination with O3b, Telesat can launch and operate its system if a coordination agreement is not reached by

This Global Public Notice Rule fosters an environment where all operators – those with higher priority and those with lower priority – know how to design and build their systems. Early applicants know their sharing obligations from the outset and are protected against unknown new systems that the operator could not have predicted when designing its system. Similarly, later applicants have certainty in planning their systems and can "lock in" their plans without fear that other applicants—whether new applicants, or earlier applicants making changes to their operations—will impose severe operational restrictions on them at a later stage, under the threat of "band splitting" if the operator does not allow those applicants the concessions they try to extract. This rule properly places the heavier burden of coordination on the party that filed later, since it will have more information at the time of its system design, but without giving any operator the unfettered ability to lock out its competitors. Knowledge of prior systems allows later applicants wide latitude to design and deploy their constellations around pathfinders and achieves the Commission's goal of "balanc[ing] the competing interests of encouraging new market entry [while] providing NGSO FSS operators certainty with respect to a minimum amount of spectrum available for their services."[14] Contrary to the Commission's assertion that

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shouldering the burden of interference mitigation. Similarly, OneWeb was able to design a system which would protect, *inter alia*, both O3b and the Telesat system. Other satellite systems seeking licensing or U.S. market access in the current processing rounds have also been designed using many techniques to protect the prior in time systems while also being protected from later-filed systems.

[14] *In re Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Notice of Proposed Rulemaking, 31 FCC Rcd 13651, 13662 ¶ 27 (2016). The Δ T/T trigger can be calculated in advance of operation. Later-in-time applicants will have full information about earlier applicants' frequencies and satellite deployment plans. If necessary, other important information, such as the location of planned gateway earth stations, can be supplied through the coordination process. Later applicants will therefore be able to access spectrum through techniques that can be planned in advance—for instance, they can choose locations for gateway earth stations, or choose to access those stations at elevation angles, in ways less likely to lead to in-line events with prior-filed systems.

the Global Public Notice Rule will "chill investment" in competing systems,[15] increased certainty for all operators at the planning stages encourages additional investment in NGSO systems.[16]

Current NGSO operators, such as O3b,[17] and early filers, such as Telesat[18] and OneWeb,[19] obtained investment capital by designing stable systems with clear operational parameters, based on reasonable projections of the operations that would be possible given the spectrum available at the time they planned their systems. This advance planning forced system engineers at companies like Telesat and OneWeb to consider prior operational systems (like O3b) and avoid imposing unreasonable conditions on those systems. For example, OneWeb took into account the prior-filed Telesat system in designing its Ka-band links, and thus does not need to rely on band-splitting to share with Telesat. Such advance planning would be unlikely

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[15] *NGSO R&O*, 32 FCC Rcd at 7825 ¶ 50.

[16] *See OneWeb Reply Comments* at 21; *In re Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Comments of Telesat Canada, IB Docket No. 16-408, at 14-15 (filed Feb. 27, 2017); *In re Update to Parts 2 and 25 Concerning Non-Geostationary, Fixed-Satellite Service Systems and Related Matters*, Comments of LeoSat MA, Inc., IB Docket No. 16-408, at 12 (filed Feb. 27, 2017).

[17] *See In re O3b Ltd. Petition for a Declaratory Ruling Granting Access to the U.S. Market for the O3b MEO Satellite System*, IBFS File No. SAT-LOI-20141029-00118, Call Sign S2935 (granted Jan. 22, 2015).

[18] *See Petition for Declaratory Ruling to Grant Access to the U.S. Market for Telesat's NGSO Constellation*, IBFS File No. SAT-PDR-20161115-00108, Call Sign S2976, Appendix A: Technical Exhibit at 29, Table 12 (listing the ITU filings on which Telesat's proposed NGSO system will rely).

[19] *See In re WorldVu Satellites Limited Petition for a Declaratory Ruling Granting Access to the U.S. Market for the OneWeb System*, IBFS File No. SAT-LOI-20160428-00041, Call Sign S2963, Attachment A: Technical Information to Supplement Schedule S at 44, Table A.9-1 (listing the ITU filings made on behalf of OneWeb).

under the Band-Splitting Rule, because new system designers will have no incentive to consider ways to protect prior systems and, further, they will have no forward view as to what spectrum will be available to them. Others may file interfering systems merely for spectrum warehousing purposes or to interfere with investment.

The Commission should reconsider its decision to increase spectrum uncertainty at precisely the time when private investment is needed to promote technologies to bridge the digital divide.[20] The Band-Splitting Rule reduces spectrum certainty and therefore increases risk and potential gaming by competitors, whether the competitors plan on building real NGSO FSS systems or not.

Finally, the Commission fails to provide any reasonable basis for adopting a domestic rule that differs from the spectrum sharing rule used throughout the rest of the world. The Global Public Notice Rule would largely align the Commission's rules with the ITU rules that govern in all other jurisdictions.[21] This would allow NGSO FSS applicants—most of whom are global in nature—to operate under a single set of global rules rather than artificially divide their systems to accommodate the U.S. regulatory regime, on the one hand, and the rest of the world

[20] Chairman Pai has made bridging the "digital divide" between well-connected and underserved areas his top priority since his first day and has repeatedly emphasized the central role of private investment in this project. *See, e.g.*, "Morning in Digital America," Remarks by FCC Chairman Ajit Pai at the Ronald Reagan Presidential Library, Simi Valley, California (Oct. 10, 2017), *available at* http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db1010/DOC-347182A1.pdf ("Every American who wants to participate in our digital economy should be able to do so. And to make that happen, we will embrace the free market, cut red tape, modernize our rules, and promote private ingenuity and investment instead of penalizing it.").

[21] *See* Int'l Telecomm. Union Radio Regulations, Chapter III, Article 11, Section II, Radio Regs. 11.28, 11.32A (2016 edition) (discussing publication of a completed notice of frequency assignment and examination of that notice for probability of harmful interference to already-recorded assignments).

on the other.[22] It would also eliminate gaming by later filers during coordination negotiations, ensuring that more NGSO operators reach a mutually agreeable solution before resorting to any Commission-ordered default or backstop. Under the Global Public Notice Rule, and following Paragraph 48 of the R&O, the Commission would also require good faith coordination to force an earlier-filed NGSO FSS system to reasonable coordination terms with later filers.

III. THE HARMS RESULTING FROM THE BAND-SPLITTING RULE FAR OUTWEIGH ANY PERCEIVED BENEFITS

There are few projects more complicated, costly, and demanding than building and launching a global NGSO FSS system. It takes enormous vision, grit, bravery, brains, and force of will to bring all the necessary pieces together to make the project happen and actually provide quality service to the end user. Even when all these pieces seem to converge, the road ahead is fraught with challenges, as demonstrated by the tireless efforts of competent potential operators like Skybridge, Teledesic, Celestri and others at the turn of the millennium. Spectrum certainty is one of the fundamental building blocks of any NGSO FSS system. Large-scale NGSO FSS systems necessarily go through challenging hardware development cycles that do not easily permit changes years into the project (*i.e.*, where OneWeb is today). Predictability at the system design stage is critical for the successful development and deployment of a large-scale NGSO FSS system.

Unfortunately, the Commission's Band-Splitting Rule undercuts this predictability and ironically creates severe uncertainty around access to spectrum for the pathfinders. The

[22] By adopting a domestic rule that differs from the ITU's long-established rules for perfecting rights to spectrum and orbital resources, the Commission also effectively deprives applicants with ITU priority of a superior right to spectrum access granted to them by an international organization to which the U.S. is a party.

Commission should recognize this harm and adopt a different approach to better facilitate spectrum sharing.

The NGSO R&O properly encourages NGSO applicants to treat voluntary coordination among operators as their first and best choice for sharing spectrum.[23] However, failing a mutual coordination agreement, the Band-Splitting Rule requires NGSO operators, regardless of their date of application, to split spectrum evenly whenever the separation between satellites results in levels exceeding the Coordination Trigger.[24] Perversely, the Band-Splitting Rule therefore promotes copy-cat systems, stifling innovation and rewarding spectrum warehousing. To illustrate how this could result in abuse, consider the relative position of Telesat and O3b. Telesat presumably designed a satellite system which would protect O3b during in-line interference events. Under the Band-Splitting Rule and absent a coordination agreement, O3b is no longer protected and Telesat becomes entitled to access half the spectrum. This dynamic also applies to other applicants granted a license or U.S. market access pursuant to a processing round.

OneWeb agrees the Commission should encourage operators to reach voluntary coordination agreements, as voluntary coordination "offers the best opportunity for efficient spectrum sharing"[25] and allows latitude for creative solutions that enable each operator to deploy its best possible NGSO system. Coordination will be easier if effort is put in at the design stage to operate with the prior designed system. To incentivize voluntary design considerations and thus improve the likelihood of coordination, the Commission must adopt an effective backstop.

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[23] *NGSO R&O,* 32 FCC Rcd at 7825 ¶ 48.

[24] *Id*. at 7825 ¶ 49.

[25] *See id.* at 7825 ¶ 48.

The backstop created by the Commission's Band-Splitting Rule creates perverse incentives for late-filers to engage in gaming strategies during system design and Stage 2 Coordination. The Band-Splitting Rule mandates an imperfect solution to the challenge of spectrum sharing when Stage 2 Coordination has failed. By requiring pathfinders to split spectrum with an unknown number of future applicants (both real and paper systems), it actually provides an incentive for late-filers to hold out during Stage 2 Coordination knowing the late-filer can force the pathfinder into band splitting. Under the Band Splitting Rule, all systems will risk potential degradation of their spectrum access. This reduces the impetus for entrepreneurial pathfinders to develop systems and commit the millions or billions of dollars necessary to build the NGSO FSS systems they have envisioned.[26] Hence, the Global Public Notice Rule not only provides needed predictability, but it also encourages operators to voluntarily coordinate.

[26] The Band-Splitting Rule also will be sure to disappoint the customers whose service must be terminated or continually degraded as more and more satellite systems come on line.

IV. CONCLUSION

For the foregoing reasons, the Commission should reconsider the Band-Splitting Rule adopted in the NGSO R&O. Instead of requiring earlier-notified NGSO FSS systems to accommodate an unknown number of future applicants, the Commission should adopt the Global Public Notice Rule because it gives earlier-notified systems priority and requires later applicants to plan their systems around those that have already been placed on global public notice.

Respectfully submitted,

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